



# HYGIENETECH

Hygiene Technologies International, Inc.

3625 Del Amo Boulevard, Suite 180  
Torrance, California 90503-1643  
(310) 370-8370  
(310) 370-7026 FAX  
[www.hygienetech.com](http://www.hygienetech.com)

January 7, 2008

CACCCI  
C/O California State Board of Equalization  
450 N Street  
Sacramento, California 94279

Document No. 20712001.1

Attention: David Gau

Regarding: Limited Fungal Growth Exposure Assessment Survey  
First Floor Day Care  
450 N Street, Sacramento, California

Dear Mr. Gau:

On October 19, 2007, Wesley B. Frey, Industrial Hygienist, with Hygiene Technologies International, Inc. (HygieneTech), visited the California State Board of Equalization building located at the above-referenced address for the purpose of conducting a limited fungal growth exposure assessment survey in the first floor Day Care facility. Those survey findings, along with the analytical data, conclusions, recommendations, and a discussion of the observations, appeared in HygieneTech Document No. 20710005.6 dated November 28, 2007. Subsequently, on December 10, 2007, HygieneTech returned to the Day Care facility and performed a follow-up survey. Those survey findings, along with the analytical data, conclusions, and recommendations appear below.

At the time of the most recent survey, air samples were collected for total (viable and nonviable) fungi analyses using a Zefon brand Bio-Pump™ equipped with Allergenco-D™ cassettes. Air samples for viable fungi were collected using a Gast brand high volume air-sampling pump equipped with an Aerotech 6™ Single Stage Bioaerosol Sampler. Viable fungal spores were impacted onto suitable growth media (malt extract agar) and incubated prior to enumeration of colony-forming units per agar plate. Additionally, surface samples were collected from selected supply air registers using HealthLink® Transporter sterile rayon tipped swab. All such samples were subsequently analyzed for fungi (including yeasts, molds, rusts, smuts, and mushrooms) by trained and experienced microbiologists at a laboratory accredited by the American Industrial Hygiene Association (AIHA) and that successfully participates in the AIHA Environmental Microbiology Proficiency Analytical Testing (EMPAT) Program. The airborne and surface fungi analytical data with supporting and background information appear in the enclosed tables.

The surface assessment data presented in Table 20712001-1 showed no evidence of fungal growth or above-background levels of fungal spores on the surface sampled.

As presented in Table 20712001-2, the airborne total spore count data showed common spore types outdoors such as *Alternaria*, ascospores, basidiospores, *Cladosporium*, colorless spores typical of *Penicillium* and *Aspergillus* species, rusts, smuts, and/or *Torula*, with *Cladosporium* predominating. In the Day Care interior, the data showed airborne concentrations of common fungal spores that were



below the levels recorded outdoors and were therefore considered unremarkable. Additionally, the wall cavity sample data indicated only low levels of common fungal spores that were well within normal and expected ranges, therefore also considered unremarkable.

The airborne viable fungi data in Table 20712001-3 showed common fungi types outdoors such as *Alternaria*, *Aspergillus niger*, *Aspergillus versicolor*, *Aureobasidium*, *Cladosporium*, non-sporulating fungi, *Penicillium*, and *Rhizopus*. The colony types detected indoors included low levels of common fungi such as *Alternaria*, *Aureobasidium*, *Cladosporium*, *Nigrospora*, non-sporulating fungi, *Penicillium*, and/or *Ulocladium*. All such data are also considered unremarkable.

By observation and upon review of the analytical data, HygieneTech has concluded that the above-background level of *Aspergillus niger* detected in the western portion of the Toddler Room during the October 19, 2007 survey was likely an anomaly. HygieneTech recommends that further air sampling be performed to substantiate the findings of the most recent survey. Such sampling shall include total (viable and nonviable) fungi analyses using Allergenco-D™ cassettes and viable fungi collected onto malt extract agar. The air sampling survey will take place during the week of January 14, 2008 and the sample locations will be a repeat of those from the December 10, 2007 survey. Again, note that the recorded data do not represent conditions that are expected to pose a health hazard to occupants above that posed by the outside environment where exposures to airborne and surface-borne fungi are known to exist.

Be advised that the data provided in this report only represent limited fungal growth and exposure potentials that existed at the time the survey was performed and at the precise sample locations indicated, the latter of which were selected based on the available background information provided. Note that fungal growth and exposure potentials may change due to changes in environmental conditions (such as those caused by water intrusion), use of mechanical systems, or other factors. Also be advised that additional fungal growth may exist at one or more locations in the structure that were not specifically assessed during the survey.

If you have any comments or questions regarding the information contained in this correspondence, please feel free to contact our offices directly at (310) 370-8370.

Sincerely,

**HYGIENE TECHNOLOGIES INTERNATIONAL, INC.**

Kenny K. Hsi, CIH  
Technical Director

Brian P. Daly, CIH, PE  
President

# HYGIENE TECHNOLOGIES INTERNATIONAL, INC.

## APPENDIX A



CLIENT: California State Board of Equalization  
450 N Street  
Sacramento, California 94279

**TABLE 20712001-1**  
**SURFACE FUNGAL GROWTH POTENTIALS**  
**FIRST FLOOR DAY CARE**  
**SACRAMENTO, CALIFORNIA**  
**DECEMBER 10, 2007**

SAMPLE NUMBER	SAMPLING LOCATION	AMORPHOUS DEBRIS	MISCELLANEOUS FUNGI/POLLEN*	FUNGI SEEN WITH UNDERLYING MYCELIAL AND/OR SPORULATING STRUCTURES**	OTHER COMMENTS	GENERAL IMPRESSION
20712001-S01WF	Preschool Room; southern end; ceiling; from reverse side of HVAC supply air register	Very heavy	Very few	None	None	Background
20712001-S02WF	Preschool Room; northern end; ceiling; from reverse side of HVAC supply air register	Very heavy	Few	None	None	Background
20712001-S03WF	Toddler Room; eastern end; ceiling; from reverse side of HVAC supply air register	Very heavy	Few	None	None	Background
20712001-S04WF	Toddler Room; western end; ceiling; from reverse side of HVAC supply air register	Very heavy	Few	None	None	Background

\*Includes basidiospores (mushroom spores), myxomycetes, plant pathogens such as ascospores, rusts and smuts, and a mix of saprophytic genera with no particular spore type predominating (indicative of normal trapping).

\*\*Quantities of fungi are graded (from least to greatest) as <1+ to 4+.

# HYGIENE TECHNOLOGIES INTERNATIONAL, INC.

## APPENDIX A



CLIENT: California State Board of Equalization  
450 N Street  
Sacramento, California 94279

**TABLE 20712001-2  
AIRBORNE TOTAL FUNGI RESULTS  
FIRST FLOOR DAY CARE  
SACRAMENTO, CALIFORNIA  
DECEMBER 10, 2007**

Page 1

**Results reported in spores per cubic meter of air (spores/M<sup>3</sup>)**

SAMPLE NUMBER	20712001-TM01OUTWF	20712001-TM02WF	20712001-TM03WF	20712001-TM04WF
<b>SAMPLING LOCATION/ACTIVITIES</b>	Outdoors; approximately 20 feet west of Day Care entrance door; approximately five feet above ground/Normal outdoor activities	Entrance hallway; about two feet west of kitchen entrance; approximately five feet above floor/ Normal Day Care activities	Southern hallway; approximately two feet north of Toddler Room entrance; approximately five feet above floor/ Normal Day Care activities	Preschool Room; northeastern corner; about three feet west of eastern partition wall; approximately five feet above floor/Normal Day Care activities
<b>START/STOP</b>	15:02:00/15:07:00	15:26:00/15:31:00	15:35:00/15:40:00	15:43:00/15:48:00
<b>SAMPLE TIME</b>	5 minutes	5 minutes	5 minutes	5 minutes
Alternaria		13		13
Arthrinium				
Ascospores	67			
Aureobasidium				
Basidiospores	133	53		
Bipolaris/Drechslera group				
Botrytis				
Chaetomium				
Cladosporium	427	160	53	107
Epicoccum				
Nigrospora				
Other brown		13	13	
Oidium				
Penicillium/Aspergillus types	320	53	107	107
Pithomyces				
Rusts	13			13
Smuts (Periconia, Myxomycetes)	40	27	27	
Stachybotrys				
Torula	13			
Ulocladium				
Hyphal fragments	<13	40	13	53
Background particulates*	2+	2+	2+	3+
<b>TOTAL **</b>	1,013	319	200	240

\*Background debris is an indication of the amount of non-biological particulate matter present on the slide and is graded (from least to greatest) as 1+ to 4+.

# HYGIENE TECHNOLOGIES INTERNATIONAL, INC.

## APPENDIX A



CLIENT: California State Board of Equalization  
450 N Street  
Sacramento, California 94279

**TABLE 20712001-2  
AIRBORNE TOTAL FUNGI RESULTS  
FIRST FLOOR DAY CARE  
SACRAMENTO, CALIFORNIA  
DECEMBER 10, 2007**

Page 2

**Results reported in spores per cubic meter of air (spores/M<sup>3</sup>)**

SAMPLE NUMBER	20712001-TM05WF	20712001-TM06WF	20712001-TM07WF	20712001-TM08OUTWF
<b>SAMPLING LOCATION/ACTIVITIES</b>	Preschool Room; southwestern corner; about four feet east of western perimeter wall; approximately five feet above floor/ Normal Day Care activities	Toddler Room; west end; about center; approximately five feet above floor/ Normal Day Care activities	Toddler Room; east end; about center; approximately five feet above floor/Normal Day Care activities	Outdoors; about 20 feet west of Day Care entrance door; approximately five feet above ground/Normal outdoor activities
<b>START/STOP</b>	15:50:00/15:55:00	15:59:00/16:04:00	16:07:00/16:12:00	16:16:00/16:21:00
<b>SAMPLE TIME</b>	5 minutes	5 minutes	5 minutes	5 minutes
Alternaria			13	13
Arthrimum				
Ascospores				
Aureobasidium				
Basidiospores	13		13	320
Bipolaris/Drechslera group				
Botrytis				
Chaetomium				
Cladosporium	53		160	747
Curvularia				
Epicoccum				13
Nigrospora				
Oidium				
Penicillium/Aspergillus types	160	107	107	107
Pithomyces				
Rusts				
Smuts (Periconia, Myxomycetes)	27			40
Stachybotrys				
Torula				
Trichocladium	27			
Hyphal fragments	27	27	67	13
Background particulates*	2+	2+	2+	2+
<b>TOTAL**</b>	280	107	293	1,240

\*Background debris is an indication of the amount of non-biological particulate matter present on the slide and is graded (from least to greatest) as 1+ to 4+.

# HYGIENE TECHNOLOGIES INTERNATIONAL, INC.

## APPENDIX A



CLIENT: California State Board of Equalization  
450 N Street  
Sacramento, California 94279

**TABLE 20712001-2  
AIRBORNE TOTAL FUNGI RESULTS  
FIRST FLOOR DAY CARE  
SACRAMENTO, CALIFORNIA  
DECEMBER 10, 2007**

Page 3

**Results reported in spores per cubic meter of air (spores/M<sup>3</sup>)**

SAMPLE NUMBER	20712007-TM09WCWF	20712001-TM10WCWF	20712001-TM11WCWF	
SAMPLING LOCATION/ACTIVITIES	Cafeteria; western partition wall contiguous with Preschool Room; about two feet north of southern partition wall; approximately six inches above floor; within wall cavity/Sampling activities only	Cafeteria; western partition wall contiguous with Preschool Room; about two feet south of northern of partition wall; approximately six inches above floor; within wall cavity/Sampling activities only	Toddler Room; western partition wall beneath window; about center; approximately six inches above floor within wall cavity/Sampling activities only	This column intentionally left blank
START/STOP	16:28:00/16:29:00	16:32:00/16:33:00	16:53:00/16:54:00	
SAMPLE TIME	1 minute	1 minute	1 minute	
Alternaria		13		
Arthrinium				
Ascospores				
Aureobasidium				
Basidiospores				
Bipolaris/Drechslera group				
Botrytis				
Chaetomium				
Cladosporium				
Nigrospora				
Penicillium/Aspergillus types	933		53	
Pithomyces				
Rusts	13			
Smuts (Periconia, Myxomycetes)	40			
Stachybotrys				
Stemphylium				
Ulocladium				
Hyphal fragments	<13	<13	<13	
Background particulates*	4+	4+	3+	
<b>TOTAL **</b>	986	13	53	

\*Background debris is an indication of the amount of non-biological particulate matter present on the slide and is graded (from least to greatest) as 1+ to 4+.

# HYGIENE TECHNOLOGIES INTERNATIONAL, INC.

## APPENDIX A



CLIENT: California State Board of Equalization  
450 N Street  
Sacramento, California 94279

**TABLE 20712001-3  
AIRBORNE VIABLE FUNGI RESULTS  
FIRST FLOOR DAY CARE  
SACRAMENTO, CALIFORNIA  
DECEMBER 10, 2007**

Page 1

**Results reported in colony forming units per cubic meter of air (CFU/M<sup>3</sup>)**

SAMPLE NUMBER	20712002-VM01OUTWF	20712002-VM02WF	20712002-VM03WF	20712002-VM04WF
SAMPLING LOCATION/ACTIVITIES	Outdoors; approximately 20 feet west of Day Care entrance door; approximately five feet above ground/Normal outdoor activities	Entrance hallway; about two feet west of kitchen entrance; approximately five feet above floor/Normal Day Care activities	Southern hallway; approximately two feet north of Toddler Room entrance; approximately five feet above floor/Normal Day Care activities	Preschool Room; northeastern corner; about three feet west of eastern partition wall; approximately five feet above floor/Normal Day Care activities
START/STOP	15:19:00/15:21:00	15:28:30/15:30:30	15:36:10/15:38:10	15:44:00/14:46:00
SAMPLE TIME	2 minutes	2 minutes	2 minutes	2 minutes
Acremonium				
Alternaria	18			
Aspergillus flavus				
Aspergillus niger	18			
Aspergillus other				
Aspergillus versicolor	18			
Aureobasidium	35		18	
Beauveria				
Bipolaris/Drechslera group				
Botrytis				
Chaetomium				
Cladosporium	442	194	141	53
Curvularia				
Epicoccum				
Fusarium				
Myrothecium				
Nigrospora		18		
Non-sporulating fungi		35	53	35
Paecilomyces				
Penicillium	406	35	18	
Phoma/coelomycetes				
Sporobolomyces				
Stachybotrys chartarum				
Torula herbarum				
Trichoderma				
Ulocladium				
Yeasts				
<b>TOTAL</b>	937	282	230	88

# HYGIENE TECHNOLOGIES INTERNATIONAL, INC.

## APPENDIX A



CLIENT: California State Board of Equalization  
450 N Street  
Sacramento, California 94279

**TABLE 20712001-3  
AIRBORNE VIABLE FUNGI RESULTS  
FIRST FLOOR DAY CARE  
SACRAMENTO, CALIFORNIA  
DECEMBER 10, 2007**

Page 2

**Results reported in colony forming units per cubic meter of air (CFU/M<sup>3</sup>)**

SAMPLE NUMBER	20712002-VM05WF	20712002-VM06WF	20712002-VM07WF	20712002-VM08OUTWF
SAMPLING LOCATION/ACTIVITIES	Preschool Room; southwestern corner; about four feet east of western perimeter wall; approximately five feet above floor/Normal nursery activities	Toddler Room; west end; about center; approximately five feet above floor /Normal nursery activities	Toddler Room; east end; about center; approximately five feet above floor/Normal nursery activities	Outdoors; about 20 feet west of Day Care entrance door; approximately five feet above ground/Normal outdoor activities
START/STOP	15:51:15/15:53:15	16:00:30/16:02:30	16:08:15/16:10:15	16:17:30/16:19:30
SAMPLE TIME	2 minutes	2 minutes	2 minutes	2 minutes
Acremonium				
Alternaria	18			
Aspergillus flavus				
Aspergillus niger				
Aspergillus other				
Aspergillus versicolor				
Aureobasidium				18
Beauveria				
Bipolaris/Drechslera group				
Botrytis				
Chaetomium				
Cladosporium	124	18	53	495
Curvularia				
Epicoccum				
Myrothecium				
Non-sporulating fungi	18		18	53
Others				
Paecilomyces				
Penicillium	18	18	18	71
Phoma/coelomycetes				
Sporobolomyces				
Stachybotrys chartarum				
Torula herbarum				
Trichoderma				
Ulocladium			18	
Yeasts				18
<b>TOTAL</b>	178	36	107	655